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Fonarow

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(54) **CAR TRANSFER ADAPTED WHEELCHAIR**

(71) Applicant: **Janice L. Fonarow**, Columbus, OH (US)

(72) Inventor: **Janice L. Fonarow**, Columbus, OH (US)

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A61G 7/10 (2006.01)

(52) **U.S. Cl.**
CPC ***A61G 7/1046*** (2013.01); ***A61G 7/1019*** (2013.01); ***A61G 7/1026*** (2013.01); ***A61G 7/1034*** (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

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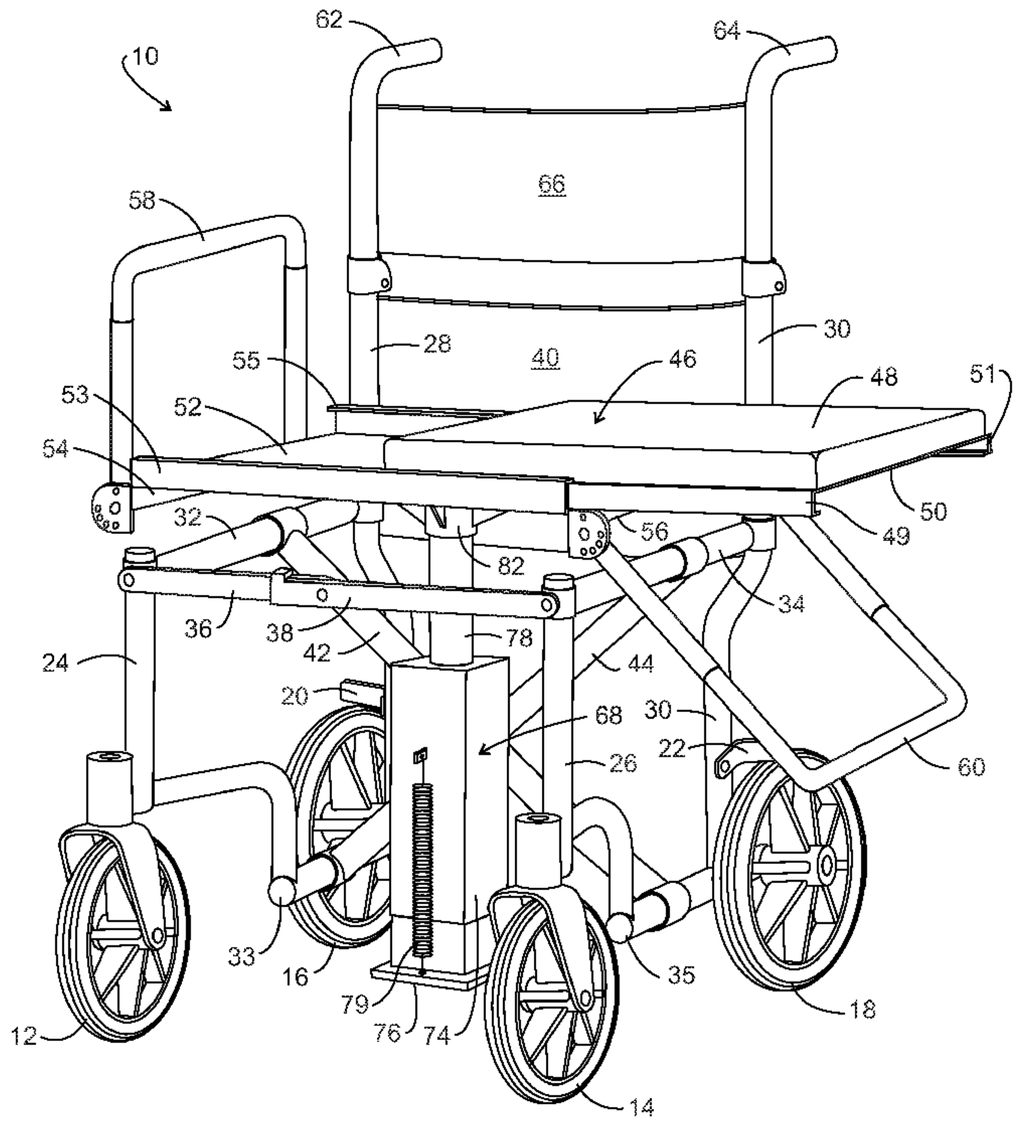
Primary Examiner — Mark C Hageman
(74) *Attorney, Agent, or Firm* — Mueller Law, LLC; Jerry K. Mueller, Jr.

(57) **ABSTRACT**

A wheelchair includes a removable seat assembly that slides laterally sideways to either side of the wheelchair for assisting a seated wheelchair occupant onto a receiving seat, such as a vehicle seat.

12 Claims, 5 Drawing Sheets



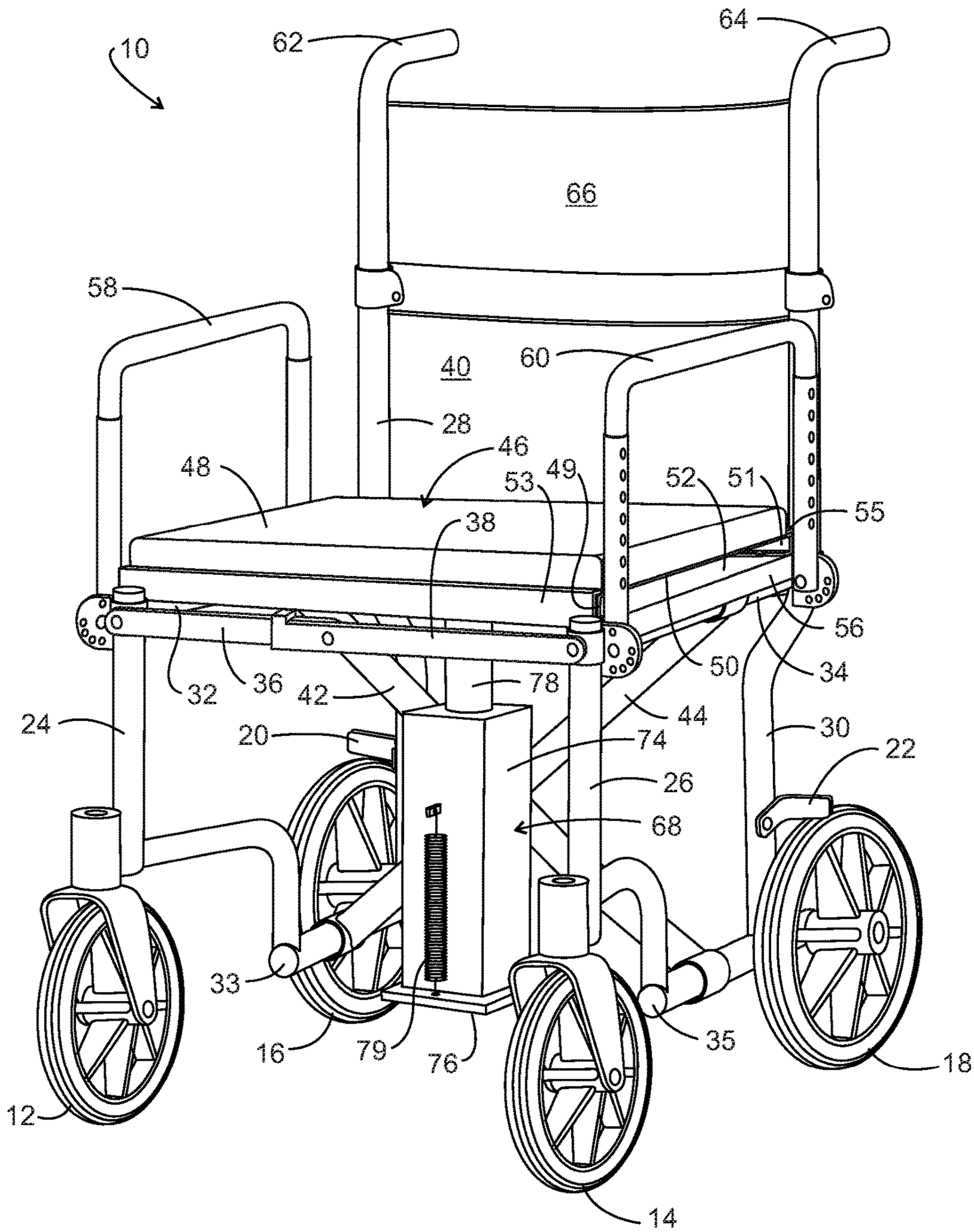

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FIG. 1

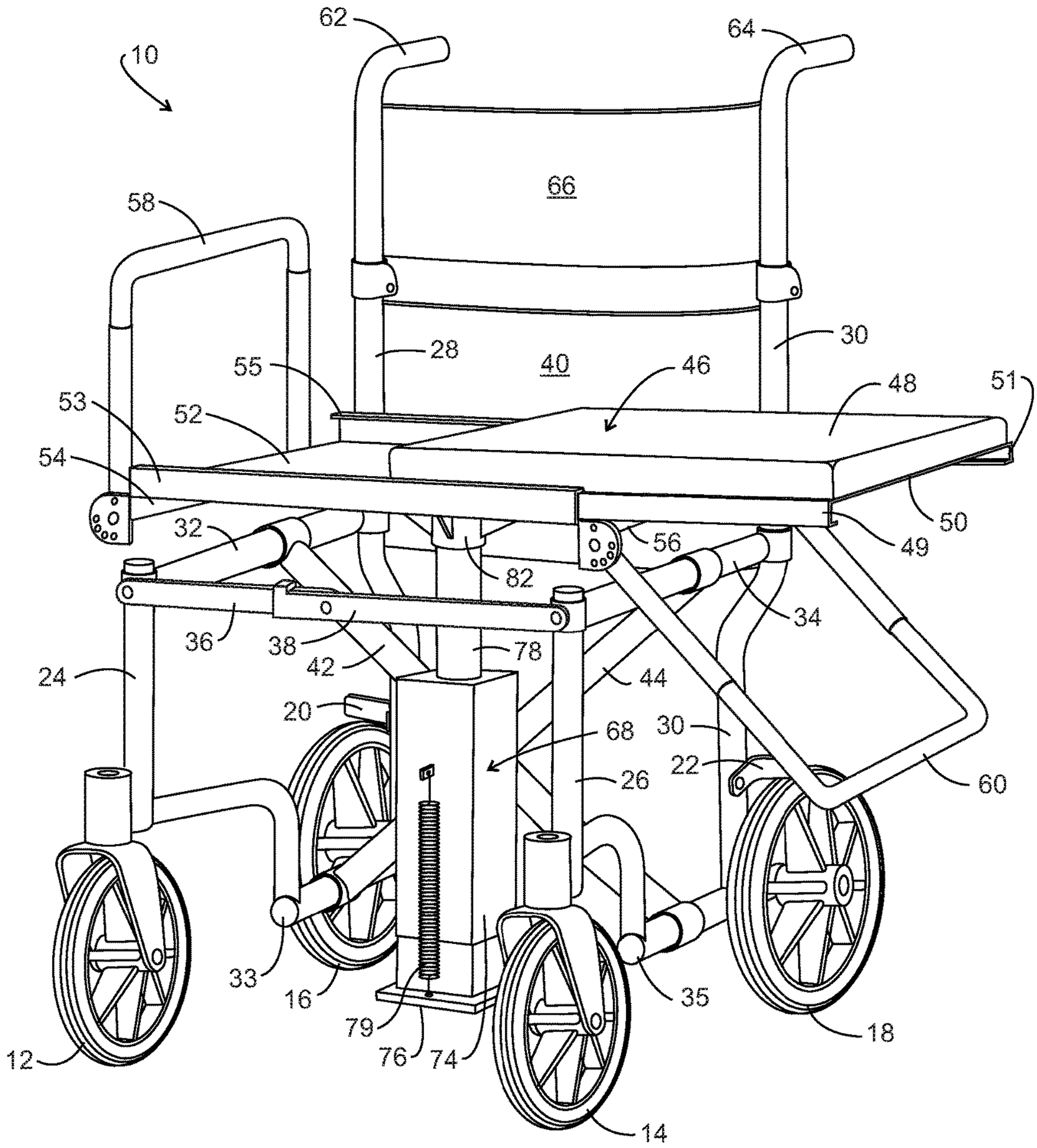
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FIG. 2

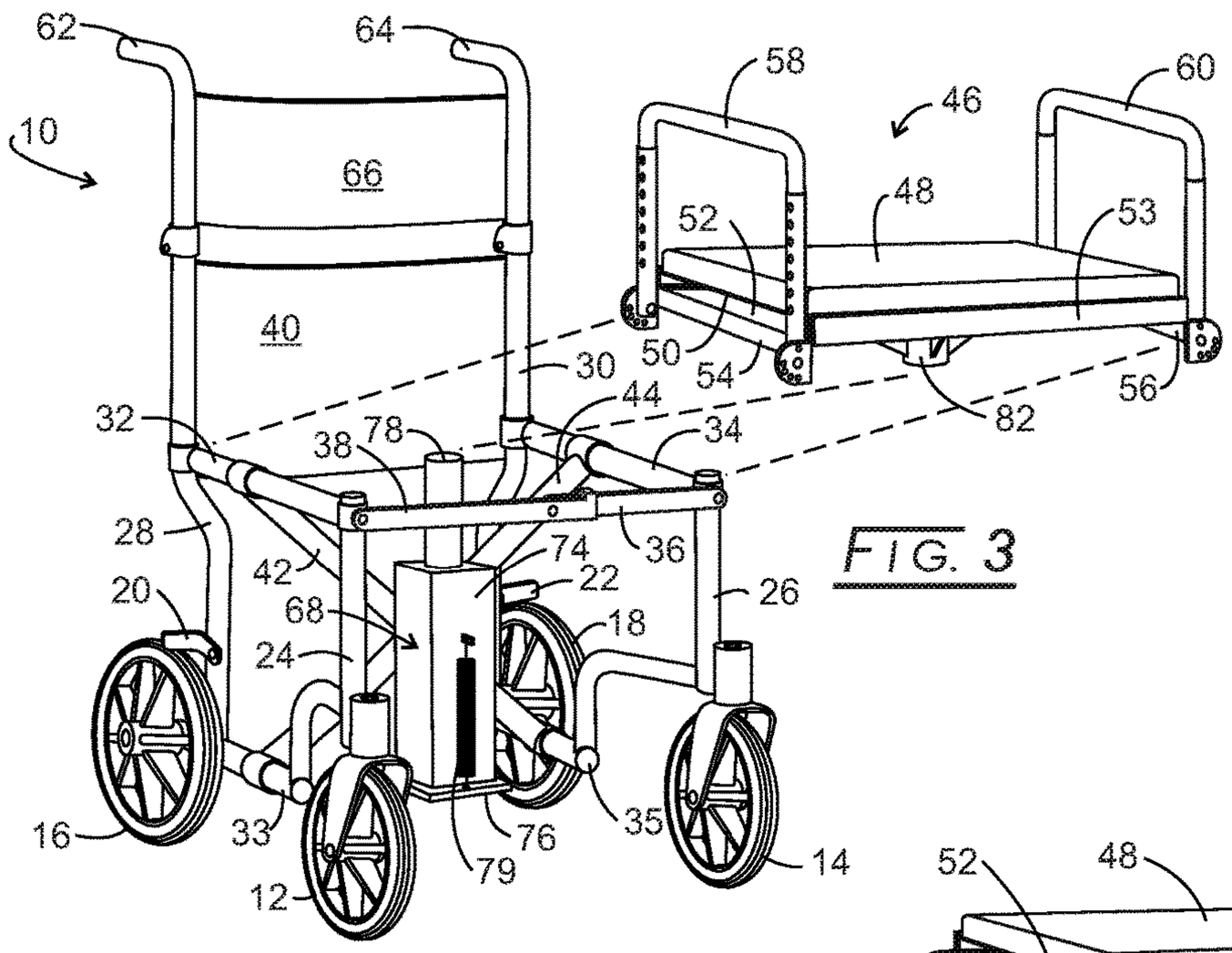


FIG. 3

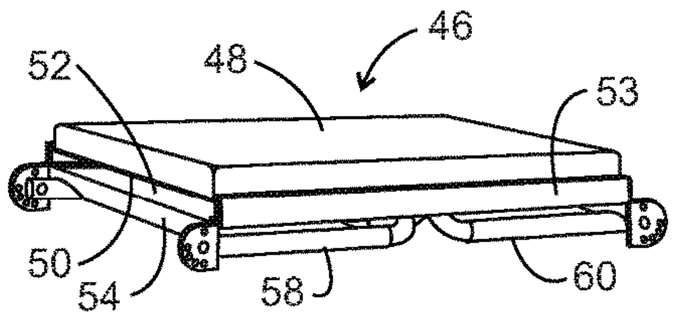


FIG. 4

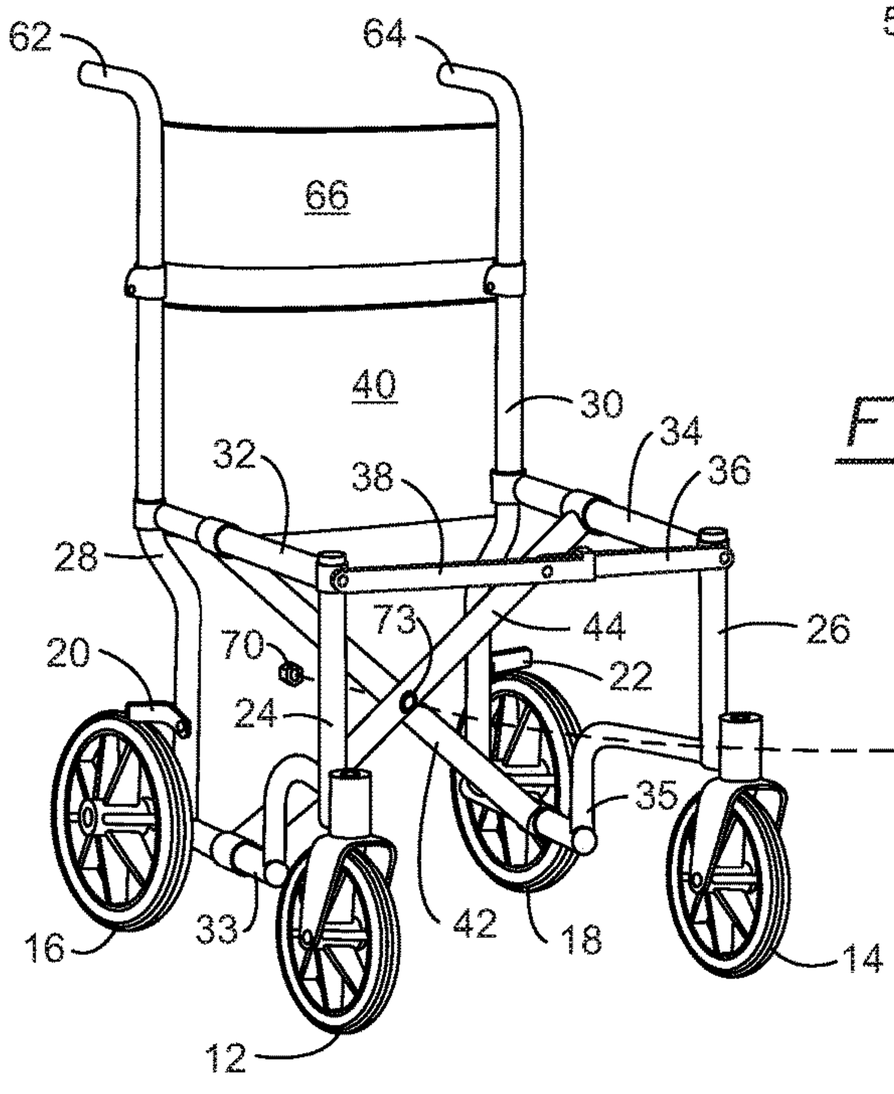
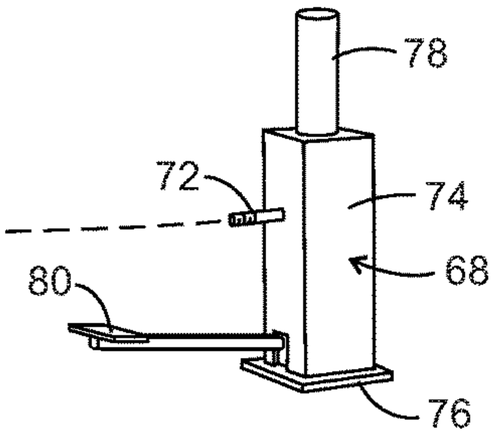


FIG. 5



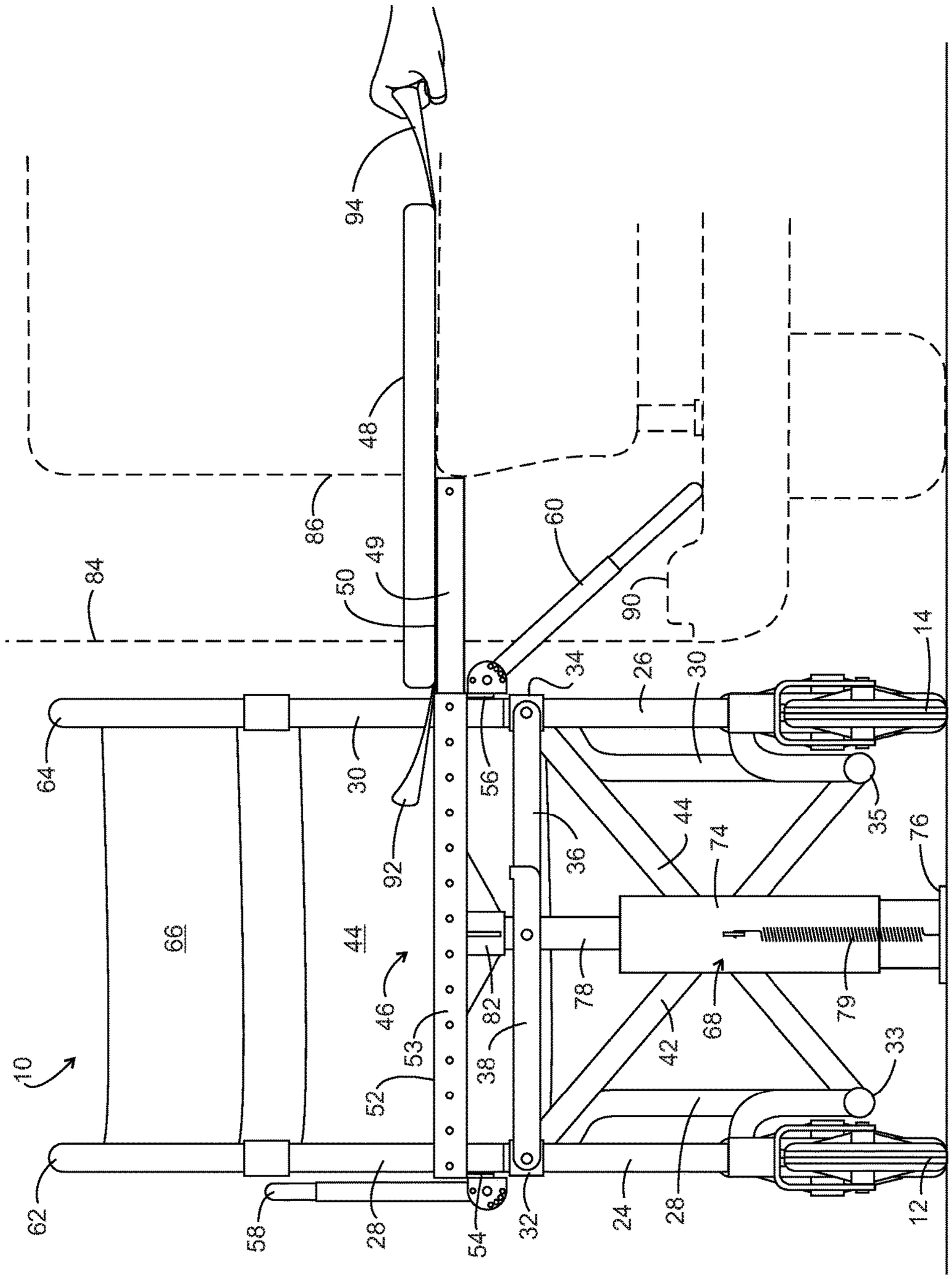

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FIG. 6

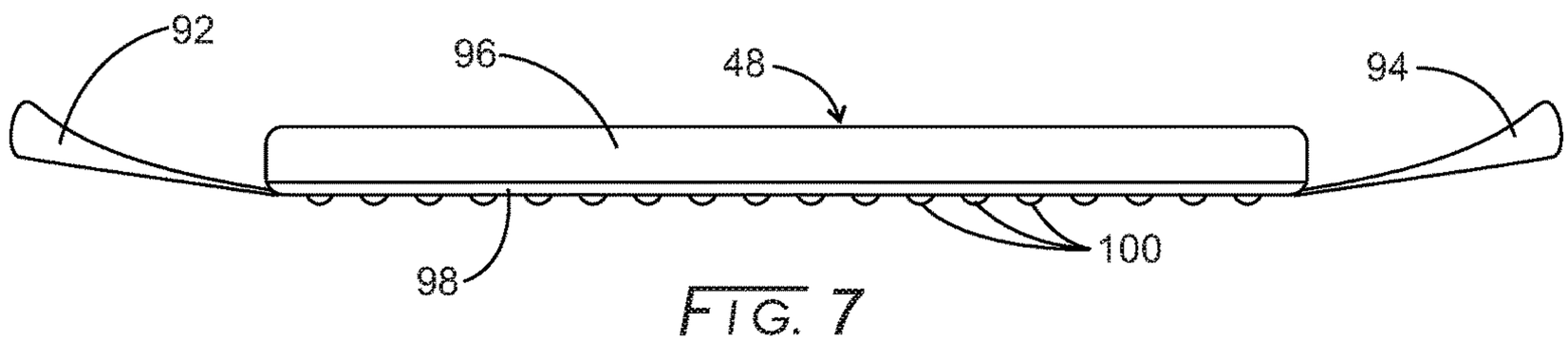

FIG. 7

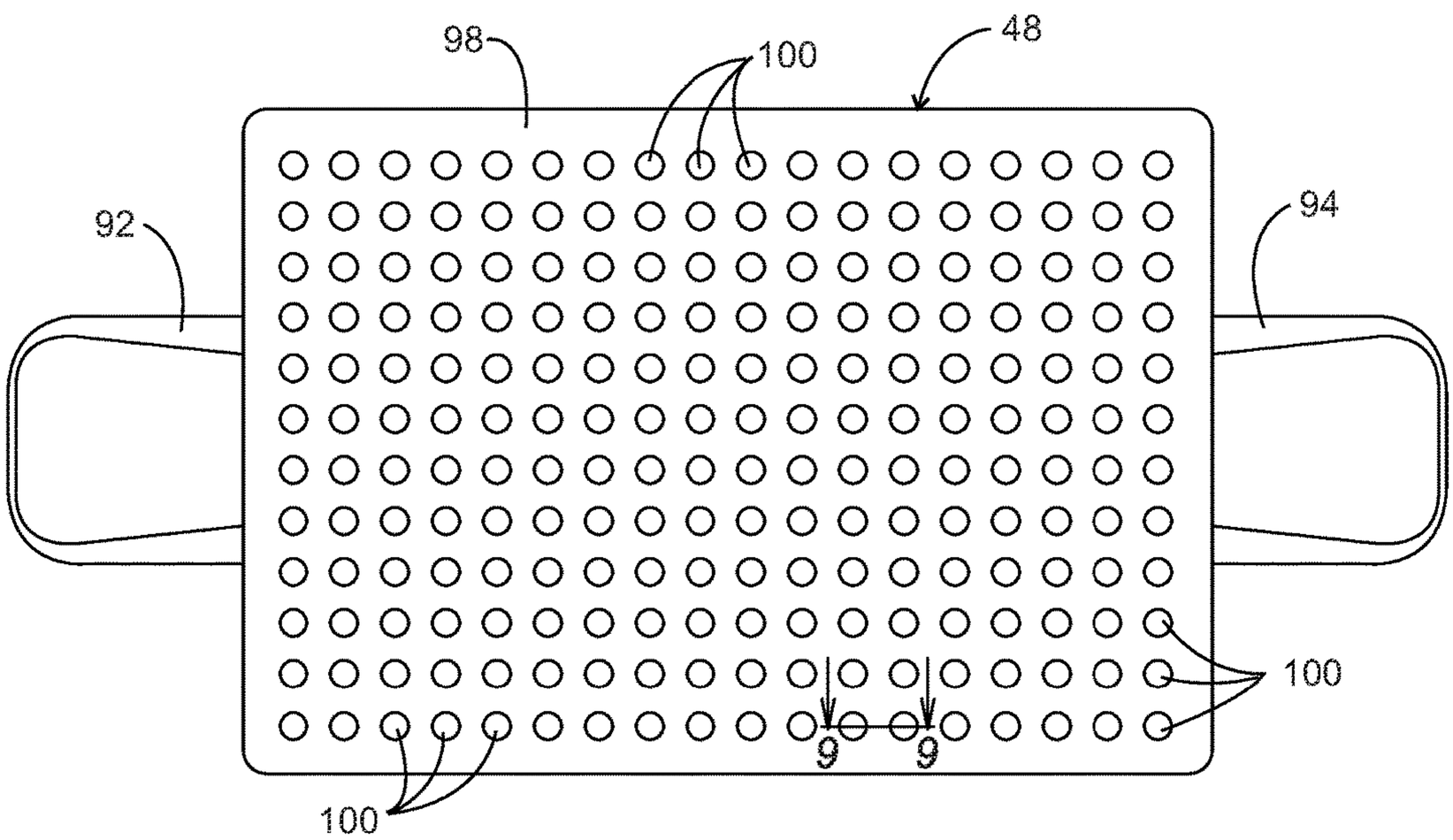

FIG. 8

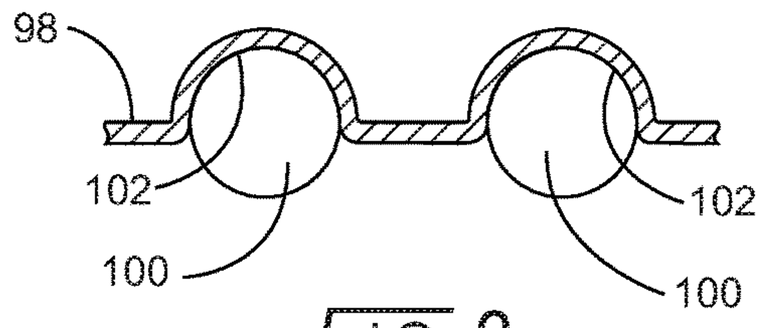

FIG. 9

CAR TRANSFER ADAPTED WHEELCHAIR

CROSS-REFERENCE TO RELATED APPLICATIONS

None.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH

Not applicable.

BACKGROUND

Conventional wheelchairs provide satisfactory performance in transporting a user within buildings and localized areas. The conventional wheelchair can be pushed by a caregiver or can be operated by a user having sufficient arm strength. Further, conventional wheelchairs can be folded to facilitate storage and transport in vehicles.

However, when the user is relatively weak and/or is unable to stand on their own, conventional wheelchairs have drawbacks. For example, the caregiver may be required to lift the user from the wheelchair and to position the user in a vehicle, a bed, or other location. This may be particularly difficult if the user is large and heavy and/or the caregiver is small and/or lacking in strength. Further, moving the user from the wheelchair to a vehicle may be difficult depending on the height and placement of the vehicle seat, and the configuration of the vehicle door. As a result, moving a user from a wheelchair to a vehicle, and vice versa, may cause stress and/or injury to the user.

Motorized wheelchairs permit the user to move about on their own, even when the user has limited strength. However, in the case of severely disabled users, a caregiver is required to lift the user from the wheelchair and to move the user to a vehicle, bed or other location, as in the case of conventional wheelchairs. Further, motorized wheelchairs are relatively expensive and require a large or specialized vehicle for transport.

Special wheelchair vehicles may include a wheelchair lift and may provide sufficient area for the user to remain in the wheelchair during travel. However, such special wheelchair vehicles are expensive and are practical primarily for hospitals, nursing homes and other institutions.

The present disclosure, then, is addressed to a modified wheelchair for transferring a person from a wheelchair into a vehicle and vice versa.

BRIEF SUMMARY

A wheelchair (**10**) is adapted for transfer of an occupant of the wheelchair laterally to a horizontal receiving seat (**86**) and includes a frame assembly. The frame assembly includes pairs of forward legs (**26**, **28**) and rearward legs (**24**, **30**), a pair of upper substantially parallel sidebars (**32**, **34**), a pair of lower substantially parallel sidebars (**38**, **40**), a pair of pivotally connected scissors bars (**42**, **44**), one each of the pivotally connected scissors bars running from one of the substantially parallel upper sidebars to an oppositely located lower substantially parallel sidebar, and a flat plate (**52**) having side lips (**54**, **56**), forward and rearward C-bars (**53**, **55**), and a retaining receiving receptacle (**82**) affixed to the bottom of the flat plate (**51**). The wheelchair also includes a forward pair of wheel assemblies (**12**, **14**) and two rear wheel assemblies (**16**, **18**), both pair of wheel assemblies carried by the frame assembly, and two rear wheel locking brake assemblies (**20**, **22**); a vertical back (**66**) carried by the frame assembly; and horizontal wheelchair seat assembly (**46**) carried by the frame assembly. The horizontal wheelchair seat assembly includes a flat plate (**50**) terminated by a pair of laterally extending C-bars **49** and **51** that are slidingly engaged with the frame assembly pair of laterally extending forward and rearward C-bars (**53**, **55**) and a cushion (**48**) carried by the flat plate (**50**), wherein the horizontal wheelchair seat assembly is extendable laterally sideways to meet the horizontal receiving seat. Finally, the wheelchair includes a removable actuatable lifting assembly (**68**) matable with the retaining receiving receptacle for lifting the horizontal wheelchair seat assembly, and a pair of lateral side, downwardly foldable armrests (**58**, **60**).

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the nature and advantages of the present method and process, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

FIG. **1** is an isometric view of the disclosed wheelchair in its home position;

FIG. **2** is an isometric view of the disclosed wheelchair in its vehicle transfer position;

FIG. **3** is an isometric view of an alternative wheelchair embodiment with removable seat assembly;

FIG. **4** is an isometric view of the removable seat assembly of FIG. **3** with arms folded underneath the seat;

FIG. **5** is an isometric view of the wheelchair of FIG. **3** showing the lift assembly and its installation onto the wheelchair;

FIG. **6** is an isometric view of the disclosed wheelchair adjacent a vehicle and in an occupant transfer position;

FIG. **7** is a side view of seat cushion movable from the wheelchair into a vehicle seat and vice versa;

FIG. **8** is a bottom view of the seat cushion shown in FIG. **7**; and

FIG. **9** is a sectional view taken along line **9-9** of FIG. **8**.

The drawings will be described in greater detail below.

DETAILED DESCRIPTION

Referring initially to FIG. **1**, a disclosed wheelchair, **10**, is shown. In conventional fashion, wheelchair **10** is fitted with **2** front caster wheel assemblies, **12** and **14**, and two rear wheel assemblies, **16**, and **18**, which rear wheels are lockable with foot pedals, **20** and **22**, in conventional fashion. The 4 wheel assemblies are fitted to a frame assembly, which may be easier to see in FIGS. **3** and **5**. The frame assembly includes 4 upstanding legs, **24**, **26**, **28**, and **30**, to which the wheel assemblies, respectively, are attached. Upstanding legs, **24**, **26**, **28**, and **30** can be telescoping. In turn, the 4 upstanding legs are attached to a pair of substantially parallel sliding bars, **32** and **34**, and are fixed to a pair of bars **33** and **35** at their bottoms. The front sliding ends of bars **32** and **34** are pivoted to a front lateral foldable assembly consisting of a pair of forward lateral bars, **36** and **38**. Forward lateral bars **36** and **38** are pivotally connected with bar **38** containing a reward locking projection that results in bar **38** being pushed down upon bar **36**, locking the bars **24** and **26** a fixed distance apart. The rear backrest **40** connects the two rear bars **28** and **30**. The backrest **40** is made of a flexible fabric that folds, along with bars **36** and **38**, locking the bars **28** and **30** a fixed distance apart. The frame assembly is completed with a pair of pivotally connected scissors bars, **42** and **44**, that span, respectively, between bar

pairs **32/35** and **34/33**. Wheelchair **10** is foldable by lifting up on forward lateral bar **38** while pivoting with forward lateral bar **36**.

A seat assembly, **46**, rests upon bars **32** and **34** in it home position. Note, that there is no lateral rear bar nor is it needed due to the rear backrest **40**. Referring now also to FIGS. **2** and **3**, the details of seat assembly **46** will be revealed. Initially, it will be noted that seat assembly **46** is removable form wheelchair **10**, as is best seen in FIG. **3**. Such removability enables wheelchair **10** to be foldable, as explained above. Seat assembly **46** includes a foam seat cushion, **48**, for the comfort of the user. Seat cushion **48** rests atop a support assembly that includes a rigid plate assembly, **50**. Rigid plate assembly **50**, in turn, slides within plate, **52**, terminated by a pair of laterally extending C-bars **49** and **51**, which slidingly engage a pair of laterally extending forward and rearward C-bars, **53** and **55**, of plate **50**. Such sliding engagement could be augmented by use of rollers, ball bearings, or other friction reducing arrangement, as illustrated in FIGS. **7-9**, described below. Even lining the surfaces of one or both of C-bars **53/55** and/or **49/51** with nylon or other friction reducing material could promote extension of seat assembly **46**.

The outwardly extending edges of flat plate **52** are terminated with slightly downwardly extending lips, **54** and **56**, that keep seat assembly **46** from unintended sliding laterally sideways in its home position. Seat assembly **46** additionally includes a pair of armrests/handles, **58** and **60**. Armrests/handles **58** and **60** are foldable downwardly, as best seen in FIGS. **2** and **4**. A variety of connections can permit such folding action. In the drawings, the connection is a tab containing a series of apertures through which a biased pin fits. By pressing in the biased pin, the arms can be adjusted. Armrests/handles **58** and **60** additionally are adjustable upwardly/downwardly by a similar aperture/biased pin assembly as permits them to be folded. Again, a variety of other such assemblies could be used for such height adjustment. As illustrated in FIG. **3**, seat assembly may be lifted from wheelchair **10** for folding of wheelchair **10**. In fact, folding of armrests/handles **58** and **60** underneath seat assembly **46** makes its storage, such as for travel, quite accommodating, as is illustrated in FIG. **4**.

Completing the description of wheelchair **10**, two upstanding handle assemblies, **62** and **64**, are attached to the rear ends of bars **28** and **30**, respectively. Again, upstanding handle assemblies **62** and **64** are foldable and could be adjustable upwardly/downwardly to accommodate the different heights of those pushing wheelchair **10**. A fabric back, **66**, stretches between upstanding handle assemblies **62** and **64** to support the back of the user and together form a back assembly for wheelchair **10**. The upper ends of upstanding handle assemblies **62** and **64** could be fitted with grips, as is customary for wheelchairs. Such grips, along with footrests, and other optional items often found on current models of wheelchairs are not shown in the drawings, and can be provided as is necessary, desirable, or convenient.

Seat assembly **46** has an additional feature that will facilitate the ingress and egress of users to and from vehicle seats. Reference now is made to FIGS. **2** and **3** that illustrate such additional feature. Initially, transfer of the wheelchair user can be made to both sides of wheelchair **10**; although, only one direction is illustrated in the drawings in the direction of armrest/handle **60** with transfer in the direction of armrest/handle **58** proceeds correspondingly similarly.

Transfer of a user to a vehicle will rely on a lifting assembly, **68**, for raising seat assembly **46**. While a variety of lifting assemblies can be contemplated and will find good use herein, the drawings show a lifting assembly, **68**, that can affixed at the pivot of pivotally connected scissors bars **42/44** using a nut, **70**, or similar hand tightenable hardware that conveniently screws only a threaded pin, **72**, extending from lifting assembly **68** and adapted to penetrate an aperture, **73**, at the scissors assembly pivot. Lifting assembly **68** consists of an external container, **74** and inner rod and piston assembly **78**, having a bottom foot, **76**. Rod and piston assembly **78** slide within external container, **74** and is biased upwardly by spring, **79**, holding the lifting assembly, **68**, off the ground surface when transporting a user. A foot pedal, **80**, extends from lifting assembly below threaded pin **72** and is accessible by the caregiver for raising lifting assembly **68**. The extending rod extending from the extending rod extending from inner rod and piston assembly **78** fits into a retaining receiving receptacle, **82** (see FIG. **3**), attached to the bottom of flat plate **52** of seat assembly **46**. The aperture in retaining receiving receptacle **82** is of sufficient depth to satisfactorily retain the extending rod extending from inner rod and piston assembly **78** for support of seat assembly **46** and a user seated thereupon for transfer to/from a vehicle seat.

For vehicle transfer, wheelchair **10** is moved adjacent to the open car door location where the destination vehicle seat is located. FIG. **6** is best viewed along with FIG. **2** for the transfer procedure where a vehicle, **84**, and seat, **86**, are shown in phantom. While it is best for wheelchair **10** to be stationed parallel to the car, this is not necessary as will be appreciated as the description unfolds below. Initially, foot pedal **80** is pumped to extend the rod of rod and piston assembly, **78**. The foot of lifting assembly, **68**, is lowered to the ground surface thus raising seat assembly **46** sufficient high that the user seated upon cushion **48** is raised to a level just higher than seat **86**. Armrest/handle **60** is moved downwardly, as shown in FIG. **2**, and into the well between seat **86** and a rocker panel, **90**, of vehicle **84**. Now armrest/handle **60** may need to be extended to move into this position for ensuring that wheelchair **10** does not unintendingly move away from vehicle **84**. Seat assembly **46** is moved laterally in the direction of vehicle **84** and seat **86**, and foot pedal brakes **20/22** are set. It should be appreciated that seat assembly **46** is permitted to rotate a bit on the rod of rod and piston assembly **78** since there is nothing prohibiting such rotation. Such slight rotation may be needed should wheelchair **10** not be sufficiently parallel to vehicle **84** in order to facilitate the transfer. Flat plate **52** is lifted up, moving lips, **54** and **56**, upwardly clearing bars, **32** and **34**, in order that it can move over and extend laterally, as illustrated in FIG. **2**.

As will be seen in FIG. **6**, seat assembly **46** is moved laterally until C-bars **49** and **51** butt up against seat **86** whereupon the user can be transferred into seat **86**. For somewhat mobile users, the user may be able to scoot onto/out of seat **86**. For non-mobile users, assistance may be required to scoot the user onto/out of seat **86**. For that purpose, each side of seat cushion **48** of seat assembly **46** has a strap, **92** and **94**, for an attendant/caregiver to hand grasp and pull both the seat cushion and seated occupant onto car seat **86** and back again from car seat **86** onto wheel chair **10**, as needed. Of course, wheelchair **10** would need to be locked for safety and lifting assembly **68** raised into an appropriate height depending upon whether the wheelchair occupant is being moved off of or onto wheelchair **10**. To facilitate movement of seat cushion **48** onto the car seat, the bottom of seat cushion **48** could be made from and/or coated a friction-reducing (plastic) material. In fact, rollers, ball

bearings, or other friction reduction arrangements could be affixed to the bottom of seat cushion **48**.

Following transfer of the wheelchair occupant into vehicle **84**, as shown in FIG. **6**, seat assembly **46**, less seat cushion **48**, then, can be moved back into its home position. If wheelchair **10** is to be put into vehicle **84**, the caregiver need only disengage rod and piston assembly **78**, which as illustrated operates much like a barber chair where lifting up on foot pedal **80** releases the assembly to its home position. Wheelchair **10** can be folded with lifting assembly **68** in position, or lifting assembly **68** can be removed before wheelchair **10** is folded up. The illustrated embodiment is sufficiently flexible in operation to permit both versions of folding.

As stated earlier, sliding engagement of seat cushion **48** onto vehicle seat **86** could be augmented by use of rollers, ball bearings, or other friction reducing arrangement. One such embodiment is illustrated in FIGS. **7-9**. In particular, foam seat cushion **48** rests atop a rigid plate, **98**, which can be made of virtually any material, but a "slippery" polymeric material is preferred in order to aid sliding of seat cushion **48** onto vehicle seat **86**. In the illustrated embodiment rigid plate **98** retains a plurality of rollers or ball bearings, **100**, which can be small in size so as to protrude only slightly therefrom in order to not cause any damage to vehicle seat **86**. The number and location of such ball bearings **100** is within the skill of the wheelchair designer and manufacturer. Ball bearings **100** make it easier for a caregiver to pull on strap **92** or strap **94** to move seat cushion **48** across vehicle seat **86** with the weight of a person seated upon seat cushion **48**. Of course, wheels or other roller assembly designs could be used in the same manner as ball bearings **100** described and illustrated herein.

While the apparatus, system, and method have been described with reference to various embodiments, those skilled in the art will understand that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope and essence of the disclosure. In addition, many modifications may be made to adapt a particular situation or material in accordance with the teachings of the disclosure without departing from the essential scope thereof. Therefore, it is intended that the disclosure not be limited to the particular embodiments disclosed, but that the disclosure will include all embodiments falling within the scope of the appended claims. Also, all citations referred herein are expressly incorporated herein by reference.

I claim:

1. A wheelchair (**10**) adapted for transfer of an occupant of the wheelchair laterally to a horizontal receiving seat (**86**), which comprises:

(a) a frame assembly comprising:

(i) pairs of forward legs (**26**, **28**) and rearward legs (**24**, **30**),

(ii) a pair of upper substantially parallel sidebars (**32**, **34**),

(iii) a pair of lower substantially parallel sidebars (**38**, **40**),

(iv) a pair of pivotally connected scissors bars (**42**, **44**), one each of the pivotally connected scissors bars running from one of the substantially parallel upper sidebars to an oppositely located lower substantially parallel sidebar, and

(v) a flat plate (**52**) having side lips (**54**, **56**), forward and rearward C-bars (**53**, **55**), and a retaining receiving receptacle (**82**) affixed to the bottom of the flat plate (**51**);

(b) a forward pair of wheel assemblies (**12**, **14**) and two rear wheel assemblies (**16**, **18**), both pair of wheel assemblies carried by the frame assembly, and two rear wheel locking brake assemblies (**20**, **22**);

(c) a vertical back (**66**) carried by the frame assembly;

(d) horizontal wheelchair seat assembly (**46**) carried by the frame assembly and comprising:

(i) a flat plate (**50**) terminated by a pair of laterally extending C-bars (**49**, **51**) that are slidingly engaged with the frame assembly pair of laterally extending forward and rearward C-bars (**53**, **55**); and

(ii) a cushion (**48**) carried by the flat plate (**50**),

wherein the horizontal wheelchair seat assembly is extendable laterally sideways to meet the horizontal receiving seat;

(e) a removable actuatable lifting assembly (**68**) matable with the retaining receiving receptacle for lifting the horizontal wheelchair seat assembly; and

(f) a pair of lateral side, downwardly foldable armrests (**58**, **60**).

2. The wheelchair of claim **1**, wherein the forward pair of wheel assemblies are caster wheels (**12**, **14**).

3. The wheelchair of claim **1**, wherein the pair of lateral side, downwardly foldable armrests (**58**, **60**) are vertically adjustable.

4. The wheelchair of claim **1**, additionally comprising a pair of upstanding handle assemblies (**62**, **64**) attached to the frame assembly for pushing of the wheelchair.

5. The wheelchair of claim **4**, wherein the vertical back is located between the pair of upstanding handle assemblies (**62**, **64**).

6. The wheelchair of claim **4**, wherein the foldable armrests (**58**, **60**) are lateral side downwardly foldable to engage a vehicle rocker panel.

7. The wheelchair of claim **1**, wherein the horizontal wheelchair seat assembly is removable and the frame is foldable.

8. The wheelchair of claim **1**, wherein the cushion has handles (**92**, **94**) affixed thereto for moving the cushion from and onto the seat assembly.

9. The wheelchair of claim **1**, wherein the cushion rigid plate retains a plurality of roller assemblies.

10. Method for transferring of an occupant seated on a wheelchair laterally to a horizontal vehicle receiving seat (**86**) of a vehicle having rocker panels (**90**), which comprises the steps of:

(i) providing the wheelchair of claim **1**;

(ii) moving the wheelchair adjacent to the horizontal vehicle receiving seat;

(iii) locking the rearward pair of locking brake assemblies;

(iv) raising the actuatable lifting assembly to raise the seat assembly;

(v) folding the foldable armrest adjacent to the vehicle receiving seat downwardly to engage the vehicle rocker panel;

(vi) extending the seat cushion laterally towards the vehicle receiving seat onto the vehicle seat.

11. The method of claim **10**, wherein a handle is grasped and pulled for the laterally extending of the seat cushion.

12. The method of claim **10**, wherein the cushion rigid plate retains a plurality of roller assemblies to facilitate the extending of the seat cushion laterally towards the vehicle receiving seat.

* * * * *